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Forest Service

Medicine Bow – Routt National Forests & Thunder Basin National Grassland

Laramie, Wyoming

May 2018

Social and Economic Report

Medicine Bow LaVA Project

Medicine Bow National Forest

Albany and Carbon Counties, Wyoming

_/s/ Kawa Ng_____ *__May 2018_____*

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REGULATORY FRAMEWORK

Federal Laws and Regulations

National Environmental Policy Act of 1969. (83 Stat. 852; 42 U.S.C. 4321, 4331-4335, 4341-4347). This act requires the use of natural and social sciences in planning and decisionmaking to fulfill the social, economic, and other requirements of present and future generations of Americans.

Multiple-Use Sustained-Yield Act of 1960. (74 Stat. 215; 16 U.S.C. 528-531). This act sets forth guiding principles for managing the resources of the National Forest System. The direction to manage these resources for the greatest good over time necessitates the use of economic and social analysis in determining management of the National Forest System.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

Forest Service Direction

Forest Service Manual (FSM) 1970 provides policy and principles for conducting economic and social evaluation of programs, resource plans, and projects in the Forest Service.

Forest Service Handbook (FSH) 1909.17 discusses how the policies and guidelines set forth in FSM 1970 should be used in the evaluation of the economic and social effects of policies, programs, plans, and projects.

Forest Plan Direction

The Medicine Bow National Forest Revised Land and Resource Management Plan (Forest Plan) has goals for social and economic conditions. The Forest Plan identifies a goal of providing multiple benefits to people, including a “sustainable level of uses, values, products, and services” (USFS 2003, pg. 1-9). This includes a sustainable supply of timber from the forest. Additionally, the plan aims to “implement vegetation management practices to reduce the threat of wildfire damage to communities and to reduce fuel loadings in the interface next to homes, cabins, and other structures” (USFS 2003, pg. 1-5).

Analysis Methodology

In this report, economic contributions (jobs, labor income and GDP) associated with timber harvest under the Modified Proposed Action is modeled using input-output analysis. Input-output analysis is a method of examining relationships within an economy, both between businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in

one or several economic activities on an entire economy, all else constant. This examination is called impact analysis. The IMPLAN® modeling system allows the user to build regional economic models of one or more counties for a particular year. The model for this analysis employed 2015's IMPLAN data.[1] IMPLAN translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy.

The economic effects are measured by estimating the direct jobs and labor income generated by the processing of the timber volume from the project. The direct employment and labor income benefit employees and their families and, therefore, directly affect the local economy. Additional indirect and induced multiplier effects (ripple effects) are generated by the direct activities. Indirect effects are felt by the producers of materials used by the directly affected industries. Induced effects occur when employees of the directly and indirectly affected industries spend the wages they receive. Together the direct and multiplier effects comprise the total economic contributions to the local economy.

[1] The latest licensed IMPLAN data available to US Forest Service analysts at the time of the DEIS analysis.

INTRODUCTION

The description, location, purpose and need and proposed action can be found in Chapter one and two of the DEIS. This section highlights the socioeconomic conditions and key issues raised during scoping, and not a comprehensive analysis of all socioeconomic aspects of restoration in the project area. The project area is located within Albany and Carbon counties, Wyoming. The Affected Environment section summarizes the existing socioeconomic conditions for the two-county area.

AFFECTED ENVIRONMENT

The existing economic and social conditions of the project area are necessary to set context for comparison of alternatives and consideration of the decision described in this section. Summaries of existing demographic, social and economic conditions are examined for counties within the project area (Albany and Carbon counties in Wyoming). Unless otherwise noted, sources consist of 2016 data from the U.S. Department of Commerce, Census Bureau, American Community Survey, Department of Labor and other official sources retrieved using the EPS-HDT (2016) software system maintained by Headwater Economics®. Only major trends and benchmark comparisons (State of Wyoming) are presented below; detailed data with complete, county-by-county statistics are found in the project record.

Key Socioeconomic Characteristics

A number of indicators determine the economic health of a place. No single indicator should be used by itself. Rather, a range of indicators should be analyzed together to get a comprehensive view of the economy. Figure 1 summarizes and compares key demographic and economic indicators from the study area (Albany and Carbon counties) to the benchmark area – The State of Wyoming. Indicators are organized by groups (trends, prosperity, stress, and structure) that highlight potential competitive strengths and weaknesses.

When compared to the Wyoming state average, the two-county project area experienced lower growth in population, employment, personal income, and per capita income from 2000 to 2015; but with higher growth in average earnings per job. The area also has a lower unemployment rate and a higher percentage of workers in the government sector.

Some indicators require a judgment call to decide whether they represent positive or negative well-being. For example, having a high percentage of personal income in a place in the form of non-labor income could mean that place has done a good job of attracting retirees and investment income, or, it could also mean there is very little labor income. When considering the benefits of growth, it is important to distinguish between standard of living (such as earnings per job and per capita income) and quality of life (such as leisure time, crime rate, and sense of well-being).

Figure 1: Key economic indicators for the two-county LaVA project area and state average (WY)

		LaVA Project Area	Benchmark: State Average
Trends	Population (percent change, 2000-2015)	12.5%	18.6%
	Employment (percent change, 2000-2015)	11.0%	25.5%
	Personal Income (percent change, 2000-2015)	44.9%	66.8%
	Average Earnings per Job (percent change, 2000-2015)	32.3%	29.7%
	Per Capita Income (percent change, 2000-2015)	28.7%	40.7%
Prosperity	Average Earnings per Job	$46,901	$54,576
	Per Capita Income	$42,721	$56,810
	Average Annual Wages - Services Related	$31,081	$38,223
	Average Annual Wages - Non-Services Related	$63,687	$67,861
	Average Annual Wages - Government Related	$49,277	$48,609
Stress	Unemployment Rate (change 2000-2015)	-0.4%	0.3%
	Unemployment Rate	3.3%	4.2%
Structure	Percent of Employment in Proprietors	21.4%	25.7%
	Percent of Personal Income in Non-Labor	37.1%	41.9%
	Percent of Services Related Jobs	54.1%	58.8%
	Percent of Non-Services Related Jobs	14.9%	22.5%
	Percent of Government Jobs	30.5%	18.6%
	Commuting (net residential adjustment share of personal income)	1.7%	n/a

Economic Resilience

One measure of economic well-being is the resilience of the local economy during periods of national recession. It is a positive sign if local employment continues to grow (or does not decline) during a recession. Another sign of economic well-being is how well the local economy recovers from a recession, measured as growth of employment from the trough (at the depth of the recession) to the peak (just before the next period of decline). Table 1 shows employment change during national recessions and as well as during recovery periods.

Table 1: Employment change during national recessions and recovery for the two-county LaVA project area.

Employment Change During National Recessions, 1976-2015	Jan '80 - July '80	July '81 - Nov '82	July '90 - Mar '91	Mar '01 - Nov '01	Dec '07 - June '09
Employment Change (Net Jobs)	1,798	-1,309	-346	101	-950
Employment Change (Monthly % Change)	1.2%	-0.3%	-0.2%	0.0%	-0.2%

Employment Change During Recovery from National Recessions, 1976-2015	Aug '80 - June '81	Dec '82 - June '90	Apr '91 - Feb '01	Dec '01 - Nov '07	Jul '09 - Dec '15
Employment Change (Net Jobs)	253	1,938	1,371	1,341	4,003
Employment Change (Monthly % Change)	0.1%	0.1%	0.0%	0.1%	0.2%

Data Sources: U.S. Department of Labor. 2017. Bureau of Labor Statistics, Local Area Unemployment Statistics, Washington, D.C.; National Bureau of Economic Research. 2009. U.S. Business Cycle Expansions and Contractions, Cambridge, MA

These employment data are presented for the two-county LaVA project area during the last five recession periods: January 1980 to July 1980; July 1981 to November 1982; July 1990 to March 1991; March 2001 to November 2001; and December 2007 to June 2009. Local employment continued to grow during the 1980 and 2001 recessions; while during the other three recessions, local employment declined minimally (from 0.2 to 0.3 percent).

Another sign of economic well-being is how well the local economy recovers from a recession. As shown in Table 1, local employment increased minimally during periods of recovery. As the economy of a place diversifies, it can become more resilient and less affected by economic downturns. This is particularly true of places that are able to attract in-migration, retain manufacturing, and support a high-tech

economy. Government employment, including in public land agencies, can help to absorb some of the losses in private sector economic activity during a recession. The negligible changes in employment in the LaVA project area during national recession as well as recovery periods suggest that the local economy is fairly insulated from the national economy (or, isolated when viewed from a different perspective), rather than an indication of economic diversity.

Employment and Wages in the Area Timber Industry

To understand the potential impact of the proposed action associated with this project, it is important to grasp the relative size of the timber industry and its components, how these have changed over time, and how local trends compare to trends in other geographies. The following table displays the number of jobs (full and part-time) in the timber industry, broken out by three major categories: growing and harvesting, sawmills and paper mills, and wood products manufacturing.

Table 2. Employment in timber, 2015

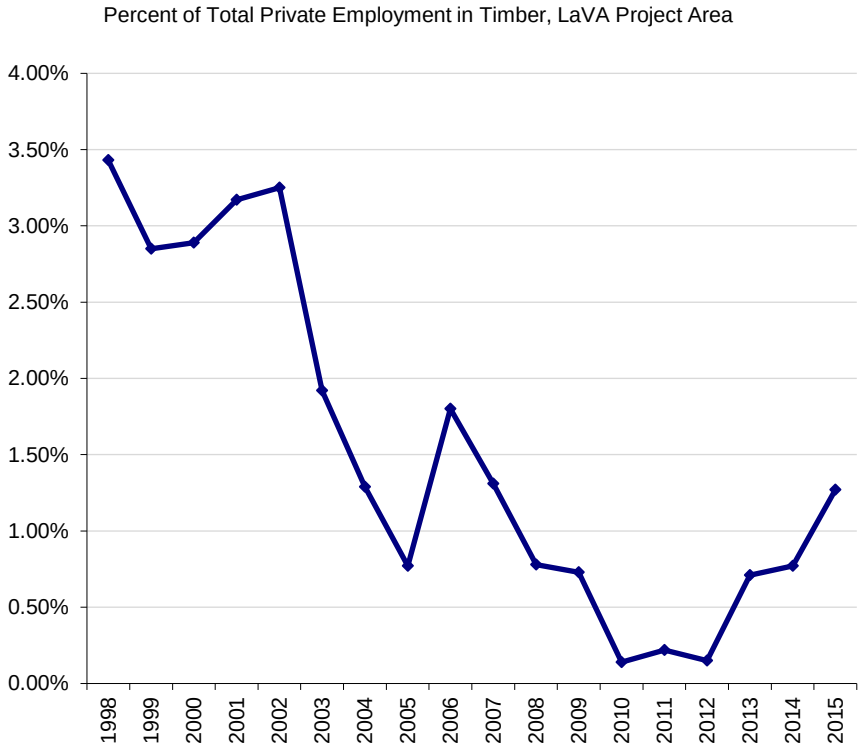
	Carbon County, WY	Albany County, WY	LaVA Project Area	State Average
Total Private Employment	4,397	9,892	14,289	219,881
Timber	153	29	182	630
Growing & Harvesting	7	14	21	71
Forestry & Logging	7	13	20	64
Support Activities for Forestry	0	1	1	7
Sawmills & Paper Mills	146	15	161	416
Sawmills & Wood Preservation	146	1	147	255
Pulp, Paper, & Paperboard Mills	0	0	0	0
Veneer, Plywood, & Engineered Wood	0	14	14	161
Wood Products Manufacturing	0	0	0	143
Other Wood Product Mfg.	0	0	0	141
Converted Paper Product Mfg.	0	0	0	2
Non-Timber	4,244	9,863	14,107	219,251

Data Sources: U.S. Department of Commerce. 2017. Census Bureau, County Business Patterns, Washington, D.C.

In 2015, 3.48 percent of Carbon County's employment was in the timber industry, while the State (WY) had 0.29 percent as a whole. Timber employment is classified in three major categories. Specifically, growing and harvesting jobs are associated with growing and harvesting of trees on a long production cycle. It includes people employed in forest nurseries, as well as those involved in the cutting of trees and transportation of timber. Sawmills and paper mills are jobs associated with converting logs into lumber, boards, poles, shingles, and similar milled products. It includes those involved in the conversion of logs and chips into pulp and paper as well as the creation of veneer and plywood. And finally, wood products manufacturing includes those jobs associated with production of corrugated boxes, gum and wood chemical products, cabinets, furniture, and other wood manufactured products.

In the two-county LaVA project area, from 1998 to 2015, non-timber employment grew from 12,953 to 14,107 jobs, an 8.9 percent increase. During the same period, timber employment shrank from 460 to 182 jobs, a 60.4 percent decrease. Overall, timber represented 3.43 percent of total employment in 1998; by 2015, timber represented 1.27 percent of total employment (Figure 2). In some areas the timber industry can be a significant driver in the economy. If it is, other sectors of the economy, as well as total employment and total personal income, will likely follow trends in the timber industry. However, that is not the case in the two-county LaVA project area. Data from Table 2 and Figure 2 suggest that the local economy is growing independent of trends in the timber industry, this indicates that management actions that potentially affect the timber industry may have impacts that are limited to the local economy.

Figure 2: Long-term trends in timber employment as a percent of all jobs in the LaVA project area



U.S. Department of Commerce. 2017. Census Bureau, County Business Patterns, Washington, D.C.

The timber industry has the potential to provide high-wage jobs, but this may differ by timber sub-sector and by geography. Table 3 shows wages (in real terms) from employment in the timber industry, including sub-sectors, compared to wages from employment in all non-timber sectors combined.

Table 3. Wages (in real terms, 2016) from employment in the timber industry, including sub-sectors, compared to wages from employment in all non-timber sectors combined.

	Carbon County, WY	Albany County, WY	LaVA Project Area	State Average
All Sectors	$46,799	$39,110	$41,511	$44,974
Private	$46,798	$32,104	$37,236	$43,814
Timber	$29,869	$28,864	$29,178	$41,127
Forestry & Logging	$29,869	na	$29,869	na
Wood Products Manufacturing	na	$28,864	$28,864	$41,127
Non-Timber	$38,062	$31,138	$33,397	$43,639
Government	$46,802	$58,944	$47,755	$48,536

U.S. Department of Labor. 2017. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Washington, D.C.

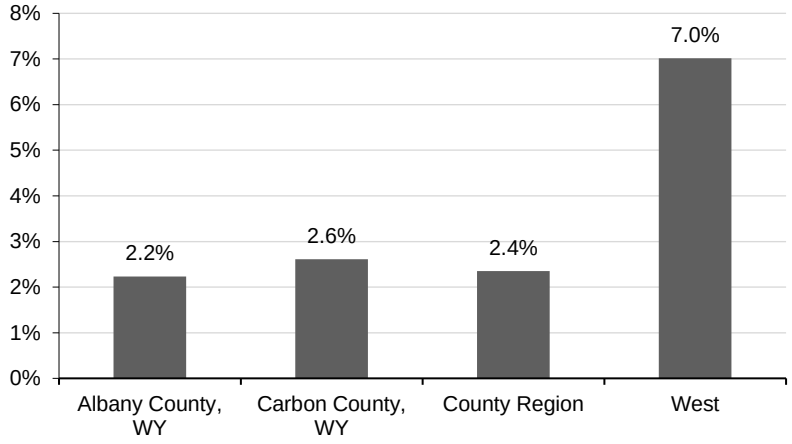
This table uses employment data from the Bureau of Labor Statistics, which does not report data for proprietors or the value of benefits and uses slightly different industry categories than those shown on previous pages of this report.

In 2016, timber sector average wages in forestry & logging were $29,869; while the average wages in the wood products manufacturing sector was $28,864. Some important issues to consider are how timber industry wages compare to wages in other sectors, whether some components of the timber industry pay higher wages than others, and if there are significant wage differences between geographies. The above data show that average wages in the private sector (including timber industry wages) tend to be lower in Albany County; while Carbon county's non-timber private sector wages exceeded the State average.

Wildland-Urban Interface

The wildland-urban interface is the area where urban development contacts natural or undeveloped land. The wildland-urban interface is especially vulnerable to wildland fire. Figure 3 displays the share of homes in the wildland-urban interface in the planning area. Approximately two percent of homes in the planning area are in the wildland-urban interface. In contrast, seven percent of homes West-wide are in the wildland-urban interface (Headwaters Economics 2018, Gude et al. 2008). This indicates that the project area is less likely to have private property at risk of wildland fire than other areas in the western United States.

Figure 3: Percent of Total Homes Built in the Wildland-Urban Interface, 2010



Source: Headwaters Economics 2018

Table 4 displays the risk of wildfire for lands already developed in the wildland-urban interface (existing) and the potential risk of wildfire should homes be built on undeveloped land in the wildland-urban interface (potential). This risk is measured using the 11 western most states and their counties. There are 414 counties, therefore a rank of 1 in 414 indicates that it is considered the most at-risk county for wildland fire, whereas a rank of 414 would indicate very low risk.

Albany and Carbon counties are both rank in the top half of counties vulnerable to wildland fire. In addition, both counties have among the highest risk (both existing and potential) in the state of Wyoming.

Table 4. Wildfire Risk to Development, West-wide and State-wide County Rankings, 2010

	Carbon County, WY	Albany County, WY
West-Wide Rank by Existing Risk	205 of 414	183 of 414
West-Wide Rank by Potential Risk	128 of 414	159 of 414
State-Wide Rank by Existing Risk	6 of 23	4 of 23
State-Wide Rank by Potential Risk	2 of 23	5 of 23

Source: Headwaters Economics 2018

Therefore, while the share of homes in the wildland-urban interface is low in the project area compared to the rest of the western United States, Albany and Carbon counties have some of the highest wildfire risk to development in Wyoming.

Environmental Justice

In 1994, President Clinton issued Executive Order 12898. This order directs federal agencies to consider the human health and environmental conditions in minority and low-income communities. The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations (Executive Office of the President 1994).

Environmental justice is the fair treatment and meaningful involvement of people of all races, cultures, and incomes, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The goal of environmental justice is for federal agency decision-makers to identify impacts that are disproportionately high and adverse with respect to minority and low-income populations and identify alternatives that will avoid or mitigate those impacts. According to USDA DR5600-002 (USDA 1997), environmental justice, minority, minority population, low-income, and human health and environmental effects, are defined as follows:

Environmental Justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by, government programs and activities affecting human health or the environment.

Minority means a person who is a member of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority Population means any readily identifiable group of minority persons who live in geographic proximity to, and, if circumstances warrant, migrant farm workers and other geographically dispersed/transient persons who will be similarly affected by USDA programs or activities.

Low-Income Population means any readily identifiable group of low-income persons who live in geographic proximity to, and, if circumstances warrant, migrant farm workers and other geographically dispersed/transient persons who will be similarly affected by USDA programs or activities. Low-income populations may be identified using data collected, maintained and analyzed by an agency or from analytical tools such as the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty.

Human Health and/or Environmental Effects as used in this Departmental Regulation include interrelated social and economic effects.

The emphasis of environmental justice is on health effects and/or the benefits of a healthy environment. The CEQ has interpreted health effects with a broad definition: “Such effects may include ecological, cultural, human health, economic or social impacts on minority communities, low-income communities

or Indian Tribes …when those impacts are interrelated to impacts on the natural or physical environment" (CEQ 1997).

Table 5 displays data on the share of low-income and minority residents in the project area.

Table 5. Environmental justice indicators

	Carbon County, WY	Albany County, WY	LaVA Project Area	State Average
Share of People Living in Poverty	14%	26%	22%	12%
Share of Population Other than Non-Hispanic White	22%	17%	18%	16%

Source: U.S. Census Bureau 2017 (from Headwaters Economics 2018)

Overall, the project area has a somewhat higher share of minority residents – those who identify as race other than "white alone" and/or as Hispanic or Latino – than Wyoming as a whole. In particular, Carbon County has a large share of Hispanic or Latino residents relative to the state.

The poverty rate in Albany County is substantially greater than the poverty rate statewide, with more than double the share of people living in poverty. The poverty rate in Carbon County is comparable to the statewide poverty rate.

These data indicate variation across the project area, but overall suggest the presence of environmental justice communities. The environmental consequences analysis will consider the potential for Forest Service management actions to disproportionately and adversely affect low-income and minority populations.

Ecosystem Services

The project area provides numerous ecosystem services, including water, timber, forage for livestock, recreation opportunities, and wildlife habitat.

Water resources from the project area contribute to municipal water supplies and wells, irrigation, recreation, stock water facilities, wildlife habitat, and aesthetic and spiritual values. Rob Roy Reservoir, Lake Owen, and Hog Park Reservoir provide water for the City of Cheyenne's public water supply. Runoff from the project area provides drinking water to a number of communities, including Albany, Baggs, Centennial, Dixon, Elk Mountain, Encampment, Jelm, Laramie, Medicine Bow, Riverside, Rock River, Ryan Park and Savery. The hydrology specialist report describes watershed, wetland, and stream health in the project area in detail.

The project area provides timber and other forest products. Insect infestations have caused large-scaled mortality on the Medicine Bow National Forest. The silviculture specialist report describes vegetation types and disturbances in the project area. As noted above, the project area has a relatively high share of employment in timber-related sectors compared to the state. However, the share of timber employment declined considerably between 1998 and 2015.

Cattle, horses, and domestic sheep herds graze on lands in the Brush Creek/Hayden and Laramie ranger districts. Both forage and water supplies in the project area contribute to the financial feasibility of livestock grazing. Public land livestock grazing contributes to both economic well-being and the maintenance of ranching culture and heritage.

The project area supports a variety of developed and primitive recreation opportunities, as described in the recreation specialist report. Tree mortality in the project area due to insects and disease create both safety and access problems for recreational users. Furthermore, the visibility of dead trees across the landscape contributes to a loss of aesthetic values for recreational users.

A number of socially-valued species are present in the project area, including the threatened Canada lynx. Habitat that supports wildlife populations contributes to human well-being in a number of ways, including opportunities for wildlife viewing, hunting, or the value of simply knowing that particular species exist. The wildlife specialist report describes how insect and disease outbreaks in the project area affect species and their habitat.

Values, Beliefs, and Attitudes

Values are “relatively general, yet enduring, conceptions of what is good or bad, right or wrong, desirable or undesirable.”

Beliefs are “judgments about what is true or false – judgments about what attributes are linked to a given object. Beliefs can also link actions to effects.”

Attitudes are “tendencies to react favorably or unfavorably to a situation, individual, object, or concept. They arise in part from a person’s values and beliefs regarding the attitude object” (Allen et al. 2009).

While many comments agreed with the Agency’s concern with tree mortality due to insect and disease outbreaks in the project area and shared a desire to improve forest health, comments revealed differing beliefs about the appropriate management response. One comment noted that, “I have seen what logging on this scale can do. Real estate values plummet, businesses will suffer, roads closed and logging truck traffic. Some types of wildlife habitat will improve and some wildlife will all but disappear. Ask a pine marten how he feels about the 'improvement'. There will be a select few logging contractors who will benefit greatly but the people who use the MBNF will be the big losers” (Scoping Letter #2).

Several comments expressed concern with the Medicine Bow National Forest’s road system, contending that: “The Forest Service’s current road system is over-sized and unaffordable. Identifying a sustainable future road system is one of the most important endeavors the Forest Service can undertake to restore aquatic systems and wildlife habitat, facilitate adaptation to climate change, enhance recreation, and

lower operating expenses" (Scoping Letter #3). The comment further noted that temporary roads would allow for "harassment of wildlife, segmenting of habitat, littering, fires, invasive plant distribution, and negative impacts to aquatic and riparian habitat, as well as the fish that depend on that habitat" (Scoping Letter #3).

Other comments requested avoiding treatment activities in proximity to the Platte River Wilderness, Savage Run Wilderness, and BLM's Prospect Mountain Wilderness Study Area, noting that this area "is critical wildlife habitat and forest on the West side of the North Platte River" and provides a connection between these wilderness areas and BLM's wilderness study area (Scoping Letter #5).

ENVIRONMENTAL CONSEQUENCES

Alternative 1 - No Action

The National Environmental Policy Act (NEPA) requires the study of the No Action Alternative and directs that this alternative be used as a basis for comparing the effects of the Proposed Action.

The No Action Alternative assumes that the Modified Proposed Action would not be implemented within the analysis area. This alternative represents no attempt to actively respond to the issues, the purpose and need for action, or concerns identified during public scoping and public engagement sessions for this project. There would be no effort to modify existing conditions, unless authorized by other decisions. Current management plans would guide management of the project area and ongoing management programs would be implemented. These other projects would proceed under separate NEPA analyses or authorities.

Direct and Indirect Effects – No Action

Regional Economic Contributions

The No Action Alternative would not incur any immediate or direct financial costs nor directly produce revenue from an Agency perspective, and make no additional economic contributions to the local economy, other than those ongoing and planned activities, including commercial timber harvest. Ongoing forest management activities and planned harvests will continue to occur, including timber currently scheduled for sale, and those that have been sold but not yet cut.

In order to meaningfully consider the contributions stemming from this project, an economic impact analysis is conducted here for the No Action Alternative to reflect planned timber harvests for the National Forest unit under existing condition. The IMPLAN® modeling software and data system is used for this economic impacts analysis – for estimating direct and indirect employment, labor income and contributions to GDP associated with timber harvest and processing in the regional economy. The study area used is as shown in the Affected Environment section.

Ground condition as well as budgetary limitation will ultimately dictate the amount of products removed, but current estimate of potential timber volume to be harvested commercially is between 40

thousand CCF and 50 thousand CCF annually for the next five to ten years. Of which, between 35 to 45 thousand CCF are assumed to be sawtimber materials while five thousand CCF as products other than logs. Given these specifications, the National Forest unit is estimated to support approximately 190 – 250 jobs, $7.7 - $9.8 million in total labor income, and $10 – 12.7 million in GDP contribution for the local economy on an annual average basis. Table 6 displays the direct, indirect and induced, and total estimates for employment (part and full-time), labor income and GDP contribution under existing condition. It is important to note that these are not new jobs or income, but rather existing jobs and income in the regional economy that are supported or sustained by National Forest timber management.

The direct employment and labor income benefit employees and their families and, therefore, directly affect the local economy. Additional indirect and induced multiplier effects (ripple effects) are generated by the direct activities. Indirect effects are felt by the producers of materials used by the directly affected industries. Induced effects occur when employees of the directly and indirectly affected industries spend the wages they receive. Together the direct and multiplier effects comprise the total economic contributions to the local economy.

Table 6: Annual average employment, labor income, and GDP contributions from timber harvest under current conditions

	Employment
Direct	107 - 136
Indirect and Induced	87 - 111
Total	**194 - 247**
	Labor Income (2017$)
Direct	$4,937,106 – $6,254,624
Indirect and Induced	$2,777,940 – $3,550,898
Total	**$7,715,045 – $9,805,522**
	Contribution to GDP (2017$)
Direct	$4,998,857 – $ 6,331,345
Indirect and Induced	$5,036,346 – $ 6,436,577
Total	**$10,035,203 – $12,767,921**

* Employment is the total full- and part-time wage, salaried, and self-employed jobs in the region.
**Labor income includes the wages, salaries and benefits of workers who are paid by employers and income paid to proprietors.

All estimates above are the expected economic contributions stemming from planned timber harvests on the National Forest unit in the next decade. Note that if future harvest levels were to drop, then the associated economic contributions would also decrease accordingly. Based upon silvicultural and resource management planning expectations, the upper-end employment / income / GDP values likely represent contribution in the first part of the decade (year 1 – 5); while the lower end values likely represent contribution during the second half of the decade (year 6 – 10). Also note that economic

contribution estimates are expressed in terms of annual averages, therefore, year-to-year results might vary.

Ecosystem Services

The No Action Alternative would not contribute to forest restoration in the project area. The risk of wildfire, insect infestations, and disease would continue in the project area. Wildfire and other disturbances could affect a number of ecosystem services and infrastructure on the forest. Water supplies to Cheyenne, Laramie, and other communities that rely on the forest for water could have their supplies adversely affected. Smoke emissions, damage to infrastructure, and the risk of falling trees due to fire, insects, and disease could displace recreationists and other forest users. These consequences are described in more detail in other specialist reports, including fire and fuels, range, recreation, and soils.

Wildland-Urban Interface

Development is expected to continue in the project area's wildland-urban interface, which would increase the number of people exposed to health and safety risks due to fire, insects, and disease. Fire would continue to threaten homes, businesses, and infrastructure in the wildland-urban interface. Forest disturbances would also continue to pose public health and safety concerns due to fire, smoke emissions, and the risk of falling trees. The No Action Alternative would not affect trends in forest health in the project area and forest disturbances, including fire, insects, and disease would continue to affect the wildland-urban interface.

Environmental Justice

As described in the affected environment section, the project area has a relatively high share of minority and low income residents. Minority and low income residents may experience differential exposure to wildland fire, changes in employment opportunities, or changes in the provision of ecosystem services.

The No Action Alternative would not affect the potential for wildland fire to threaten human safety and property in the project area. Low income individuals have fewer resources to engage in averting behavior (e.g., leaving town during a wildfire to avoid smoke emissions). However, since the vast majority of homes in the wildland-urban interface in the project area are second homes, the individuals with the highest exposure to wildfire risk are expected to be relatively affluent (Headwaters Economics 2018).

The No Action Alternative would not affect employment or labor income in the project area. Therefore, no disproportionate or adverse effects related to changes in economic opportunities would occur as a result of this alternative.

The provision of ecosystem services may be affected by the No Action Alternative, however, these effects would not disproportionately affect low income and minority residents. The effects to low income and minority populations are expected to be consistent with those described above in the "ecosystem services" portion of this analysis above.

Cumulative Effects – No Action

Reasonably foreseeable projects include:

- Battle Mountain Prescribed Burn CE (Carbon County) – prescribed burn
- North Savery EIS (Carbon County) – hazard tree clearing, precommercial thinning and salvage harvest, road proposals
- Ryan Park Vegetation and Fuels CE (Albany and Carbon counties) – hazardous fuels treatment
- West Side Snowy Range Travel Management EA (Carbon County) – modify road and trail system
- Fox Creek Vegetation Management CE (Albany County) – treat Mountain Pine Beetle infested stands
- Owen Timber Sale Additional Treatment in Cheyenne BoPU Catchments CE (Albany County) – hazardous fuels treatment

Past and on-going activities, including fuels treatment, hazard tree removal, road and trail system management, and timber harvest activities affect social and economic conditions in the project area. The employment and labor income associated with current and planned timber harvest activities are described as part of the direct and indirect effects analysis.

Reasonably foreseeable activities may reduce the risk of falling trees and wildfire relative to current conditions, but these activities are insufficient to move toward desired conditions (per fire and fuels specialist report). The No Action Alternative would not contribute to achieving desired conditions. Wildfire, smoke emissions, and falling trees would continue to pose safety risks and potentially displace recreation visitors, nearby residents, and other forest users.

Alternative 2 – Modified Proposed Action

The Forest Service proposes to conduct vegetation management activities on National Forest System lands, including inventoried roadless areas, within the Sierra Madre and Snowy Range mountain ranges of the Medicine Bow National Forest. Vegetation management activities, including prescribed fire, mechanical, and hand treatment methods could be applied on up to 360,000 acres to make areas more resilient to future disturbance; protect, restore, and enhance forest ecosystem components; supply forest products to local industries; provide for human safety; reduce wildfire risk to communities, infrastructure, and municipal water supplies; and improve, protect, and restore wildlife habitat. Specific treatments would be developed and authorized for implementation over a 10-year period beginning in 2018 and would be completed within approximately 15 years of the project decision. A combination of commercial timber sales, service contracts, cooperative authorities, partner capacity, and Forest Service crews would be used to implement the project.

Direct and Indirect Effects – Modified Proposed Action

Regional Economic Contributions

An economic impact analysis is conducted here to include planned timber harvests for the National Forest unit with the implementation of the Modified Proposed Action. The IMPLAN® modeling software and data system is used for this economic impacts analysis – for estimating direct and indirect employment, labor income and contributions to GDP associated with timber harvest and processing in the regional economy. The study area used is as shown in the Affected Environment section.

Ground condition as well as budgetary limitation will ultimately dictate the amount of products removed, but current estimate of potential timber volume to be harvested commercially is between 45 thousand CCF and 50 thousand CCF annually for the next five to ten years. Of which, approximately 40 to 45 thousand CCF are assumed to be sawtimber materials while an additional five thousand CCF as product other than logs. Given these specifications, the National Forest unit is estimated to support approximately 220 – 250 jobs, $8.7 - $9.8 million in total labor income, and $11.4 – 12.7 million in GDP contribution for the local economy on an annual average basis. Table 7 displays the direct, indirect and induced, and total estimates for employment (part and full-time), labor income and GDP contribution under existing condition. It is important to note that these may or may not be new jobs or income, but rather existing jobs and income in the regional economy that are supported or sustained by National Forest timber management. It must also be stressed that the economic contributions estimated here cannot be viewed or described as *economic benefits*. Economic contributions are expressed in terms of employment, income, and GDP. These are the distributional effects associated with timber production or other economic activities in the area economy, and must not be conflated with economic benefits (which are obtained through financial efficiency analysis).

Table 7: Annual average employment, labor income and GDP contributions from timber harvest under the Modified Proposed Action

	Employment
Direct	122 - 136
Indirect and Induced	98 - 111
Total	**220 - 247**
	Labor Income (2017$)
Direct	$5,595,865 – $6,254,624
Indirect and Induced	$3,164,419 – $3,550,898
Total	**$8,760,283 – $9,805,522**
	Contribution to GDP (2017$)
Direct	$5,665,101 – $6,331,345
Indirect and Induced	$5,736,461 – $6,436,577
Total	**$11,401,562 – $12,767,921**

* Employment is the total full- and part-time wage, salaried, and self-employed jobs in the region.
**Labor income includes the wages, salaries and benefits of workers who are paid by employers and income paid to proprietors.

These estimates are the expected economic contributions stemming from planned timber harvests with the implementation of the Modified Proposed Action over the next decade. Note that if future harvest levels were to drop – commercial volume associated with LaVA or otherwise – then the associated economic contributions would also decrease accordingly. Based upon silvicultural and resource management planning expectations, the upper-end employment / income / GDP values likely represent contribution in the first half of the decade (year 1 – 5); while the lower end values likely represent contribution during the second half of the decade (year 6 – 10). Also note that economic contribution estimates are expressed in terms of annual averages, therefore, year-to-year result might varies.

Since the model assumed that total timber volume associated with the Modified Proposed Action would occur over the next 10-15 years, estimates of average annual part-time and full-time jobs shown in Table 6 and Table 7 are heavily dependent upon harvest implementation. If the actual implementation period is shorter, more jobs may be supported over a shorter period of time. Conversely, if the implementation period is expanded, fewer jobs may be supported annually but for a longer period of time. Also, within the implementation period of the project, the numbers of jobs supported may or may not be filled by the same personnel nor distributed evenly over time, depending upon the nature of the project, turnovers, number and type of firms involved and other factors. Therefore, it would be misleading – or, not meaningful at best – to calculate a 'total employment over the life of the project' figure. Due to these issues, readers are further cautioned against multiplying the average annual employment number(s) as presented above, with the project implementation timeframe (years) in an attempt to arrive at the 'total employment over the life of the project' figure.

It should be noted that IMPLAN's method of reporting employment as annual averages means that one cannot discern the number of hours worked or the proportion that is full time vs. part time. This method of accounting means that one job lasting 12 months = two jobs lasting six months each = three jobs lasting four months each. Each of those examples would appear as one job in IMPLAN and as reflected by the above results.

It is therefore helpful to consider employment figures shown in Table 6 and Table 7 as the 'accumulative' employment effects or requirement, across sectors in the local economy, associated with the proposed activities (in this case those direct, indirect and induced labor necessary to support the harvest of 40 – 50 thousand CCF on an annual average basis). In other words, 'one job' as reported in IMPLAN may be a collection of different jobs (e.g. 'one job' may be the summation of 1 full-time equipment operator working 3 months + 1 full-time driver working 3 months + 2 half time office support staffs working 6 months each).

It is also important to note that there may be additional jobs, labor income and GDP contributions associated with other restoration related activities (those without product removal components). Because restoration firms also incur various expenditures (labor costs, fuel, equipment, etc.) associated with MBNF contracted activities. The direct ecosystem restoration employment and labor income benefit employees and their families; while additional indirect and induced multiplier effects (ripple

effects) are generated by, or associated with various direct restoration activities, from mechanical and manual fuel treatments, to thinning or burning understory vegetation.

Ecosystem Services

The Modified Proposed Action Alternative would contribute to forest restoration in the project area. Forest restoration is expected to lower the risk of wildfire, insect infestations, and disease in the project area. The Modified Proposed Action Alternative would enhance and protect a number of ecosystem services and infrastructure on the forest. Water supplies to Cheyenne, Laramie, and other communities that rely on the forest for water would be less likely to experience negative shocks to water quality or quantity than under the No Action Alternative. Smoke emissions, damage to infrastructure, and the risk of falling trees due to fire, insects, and disease, which displace recreationists, livestock operations, and other forest users would be less likely under the Modified Proposed Action Alternative than the No Action Alternative. These consequences are described in more detail in other specialist reports, including fire and fuels, range, recreation, and soils.

However, proposed project activities also have the potential to damage ecosystem services. Roads and skid trails could increase sedimentation. Vegetation management activities in inventoried roadless areas may interfere with visitors' sense of solitude in these areas. These consequences are described in more detail in other specialist reports, including recreation and soils.

Wildland-Urban Interface

Development is expected to continue in the project area's wildland-urban interface, which would increase the number of people exposed to health and safety risks due to fire, insects, and disease. Fire would continue to threaten homes, businesses, and infrastructure in the wildland-urban interface. Forest disturbances would also continue to pose public health and safety concerns due to fire, smoke emissions, and the risk of falling trees. The Modified Proposed Action Alternative would prioritize restoration treatments in the wildland-urban interface to reduce wildfire risk. The Modified Proposed Action Alternative would reduce threats to property and human safety relative to the No Action Alternative.

Environmental Justice

As described in the affected environment section, the project area has a relatively high share of minority and low income residents. Minority and low income residents may experience differential exposure to wildland fire, changes in employment opportunities, or changes in the provision of ecosystem services.

The Modified Proposed Action Alternative could affect the potential for wildland fire to threaten human safety and property in the project area. The Modified Proposed Action Alternative would authorize restoration activities across the forest, which aim to reduce the extent and intensity of wildfire. Low income individuals have fewer resources to engage in averting behavior (e.g., leaving town during a wildfire to avoid smoke emissions). However, since the vast majority of homes in the wildland-urban interface in the project area are second homes, the individuals with the highest exposure to wildfire risk are expected to be relatively affluent (Headwaters Economics 2018).

The Modified Proposed Action Alternative would support employment and labor income in the project area, as described in the "regional economic contributions" section above. Low income individuals may particularly benefit from new economic opportunities in the project area. However, the estimated economic impact is minor in the context of the local economy and it is unknown whether those jobs would provide opportunities to currently unemployed or underemployed individuals.

The provision of ecosystem services may be affected by the Modified Proposed Action Alternative, however, these effects would not disproportionately affect low income and minority residents. The effects to low income and minority populations are expected to be consistent with those described above in the "ecosystem services" portion of this analysis above.

Cumulative Effects – Modified Proposed Action

Reasonably foreseeable projects include:

- Battle Mountain Prescribed Burn CE (Carbon County) – prescribed burn
- North Savery EIS (Carbon County) – hazard tree clearing, precommercial thinning and salvage harvest, road proposals
- Ryan Park Vegetation and Fuels CE (Albany and Carbon counties) – hazardous fuels treatment
- West Side Snowy Range Travel Management EA (Carbon County) – modify road and trail system
- Fox Creek Vegetation Management CE (Albany County) – treat Mountain Pine Beetle infested stands
- Owen Timber Sale Additional Treatment in Cheyenne BoPU Catchments CE (Albany County) – hazardous fuels treatment

Past and on-going activities, including fuels treatment, hazard tree removal, road and trail system management, and timber harvest activities affect social and economic conditions in the project area. The employment and labor income associated with current and planned timber harvest activities, as well as proposed LaVA activities, are described as part of the direct and indirect effects analysis.

Reasonably foreseeable activities may reduce the risk of falling trees and wildfire relative to current conditions. These reasonably foreseeable activities complement the Modified Proposed Action Alternative to move toward desired conditions (per fire and fuels specialist report). The cumulative effect of the Modified Proposed Action Alternative and reasonably foreseeable activities would reduce the safety risks and potential displacement of forest users associated with falling trees. Fuel reduction activities could reduce the potential for smoke emissions to displace or adversely affect forest users and nearby residents and reduce the risk of damage to infrastructure and important ecosystem services (e.g., public water supplies).

COMPLIANCE WITH REGULATORY DIRECTION

This analysis complies with law, regulation, and policy, which direct the Forest Service to evaluate and disclose social and economic effects, including environmental justice consequences, associated with the agency's policies, programs, plans, and projects.

The Modified Proposed Action is consistent with Forest Plan goals to provide sustainable levels of forest goods and services and to reduce the threat of wildfire damage to communities. The Forest Plan does not identify standards and guidelines specific to social and economic conditions.

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